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and with a proper sense of restraint, of the elaborations of the science.

Mineralogy offers a field of attractive experiment and has in some museums reached stages of taxonomic complexity. The history of minerals might very properly form the introductory stage with examples of ancient nomenclature: that followed by Theophrastus, Aristotle, Dioscorides and Pliny; then the later and mediæval period with reference to the lucubrations of Marbodius, Albertus Magnus and Agricola; and then the crystallographic systemic period of Jamitzer, Steno, Bergman, Rome de Lisle, Haüy, Bernhardt, Weiss, Mohs, Newman, Whewell, Miller. Following this as a logical pendent would come an exhibit of crystals with an anatomical analysis of their parts, somewhat as Professor Crosby has devised in the Museum of the Boston Society of Natural History. The physical properties, color, lustre, hardness, refraction, fluorescence, fusibility of minerals and illustrations of optical principles would be incorporated in this section. Finally, their distribution, which, under lithological and economic supervision, would show the occurrence of the silicates, crystalline schists, marbles, limestones, elastics, eruptives, and the zones and centers of deposit of the useful or valuable ores, all illuminated by diagrams, maps and photographs. Then would follow the mineral cabinet, a display of expressive and beautiful specimens, subordinated to a chemical system, in which the design so well illustrated by Professor Egleston, in the cabinet of the School of Mines, of showing the varieties of a mineral, often so extreme and perplexing, would receive complete vindication. It seems impossible that a conspectus of minerals, arranged upon so wide and exhaustive and illuminative a plan, would not leave the attentive mind notably strengthened and informed. Similarly, in the various departments of zoology the most at-

tractive and intelligent development of visual instruction could be followed with most fascinating and novel results. In geology, of which it has been lately remarked by Professor A. Geikie with relation to the extraordinary vitality of that science in the United States that "surveys, professorships, museums, societies, journals in almost every State are the outward embodiment of the geological zeal that appears to animate the whole community;" in geology the scheme of historical development might also be partially followed, while an elaboration in diagrams, photographs and descriptions of the morphology and significance of the groups of fossils should take precedence of an endless display of species. In large and capacious halls the systematic and the explanatory methods might both be utilized and combined. And, finally, in this connection, there seems a fascinating propriety in making a museum also a gallery of biography; the faces and some short sketch of their lives of the great investigators and systematists would seem appropriately placed amidst the teeming results and facts their genius and industry have produced and discovered.

The mechanical details of exhibition require all the charm, convenience, and even beauty, which the resources of the institution permit, and especially, should all architectural construction bend subserviently to the underlying necessity in every museum, the best illumination. Light, bathing everything with luminous clearness, is the very symbol of the museum purpose.

L. P. GRATACAP.

AMERICAN MUSEUM OF NATURAL HISTORY.

(To be Concluded.)

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ANTHROPOLOGICAL EXHIBIT OF THE U. S.  
NATIONAL MUSEUM AT THE  
OMAHA EXPOSITION.

THE frequency with which the National Museum has been called upon to prepare

exposition exhibits has made it somewhat difficult always to secure fresh and interesting material for display. To obviate this difficulty in the Anthropological Department, it was decided to assemble the limited group of exhibits required, on a plan differing essentially from that adopted at previous expositions.

Heretofore the materials have been brought together in a somewhat disconnected way to illustrate particular peoples, or especial arts or industries. On the present occasion the activities of man are treated from the point of view of their development. The various lines of progress are represented by series of objects each individual typifying a step in the industrial and intellectual evolution of the race.

As the exhibits required had to be drawn from all divisions of the Department, a single series of objects in many cases being made up from the collections of two or more divisions or sections, members of the anthropological staff were called upon to act as committees in assembling the exhibits in which they were personally concerned. The full resources of the Museum were thus drawn upon, yet the objects taken were so few in number as not to interfere with the present museum installation.

Each series of exhibits epitomizes a single branch of art or industry and occupies a single case front or a fraction thereof, and may thus be conveniently seen at one view. The scheme of treatment or presentation is just such as the systematic student would adopt in writing the history of the subject, beginning with the inceptive stages and moving forward step by step to the highest development. The following subjects are presented, the series beginning at the left in the cases and progressing toward the right :

*The use of fire.* The story, illustrated in part by means of colored drawings, begins with the fire of volcanoes and lightning and the carrying of firebrands from these sources

for rekindling ; it is continued in a series of exhibits showing progressive steps in the making of fire which is illustrated by rubbing sticks, revolving drills, flint and steel, the lucifer match and devices for producing the electric spark.

*Illumination.* Two series of objects are shown, the first illustrating the torch in its many forms, arranged progressively ; the second the lamp, beginning with the stone cup with oil and wick, and ending with the argand burner and the arc light.

*Fishing.* Of the various exploitative activities, so necessary to the sustenance of the race, only one group—the arts of fishing—is represented, others having been omitted for want of space. Series 1 illustrates the dart in its multiplicity of forms, series 2 the various toggle devices, series 3 the hook, and series 4 the sinker.

*Domestic arts.* Household arts are represented by four series, one epitomizing the history of cooking, and three illustrating utensils and devices employed in eating and drinking—the cup, the spoon and the knife and fork.

*Tools of general use.* The history of the more essential tools of human handicraft is epitomized in seven series, each beginning with the simplest forms—mere splinters and masses of stone—and ending with the highest forms—the marvelous machine-operated tools of to-day. These tools are the hammer, the ax, the adz, the knife, the saw, the drill and the scraper.

*Weapons.* Weapons of war have performed a most important part in the history of progress, and the steps that led up from the stone and club, held in the hand, to the steel sword and the compound machine gun are strikingly suggested in the two series presented : 1. Weapons for use in the hand—piercing and slashing weapons ; and 2. Projectile weapons—the bow and arrow, the cross-bow and the pistol and gun.

*Transportation—marine.* The history of water transportation is epitomized in four of its leading lines of elaboration: 1. The hull, beginning with the log raft and ending with the magnificent substructure of the modern ship (represented by models). 2. Hand propulsion—the pole, the paddle and the oar (in part models). 3. The paddle wheel (models); and 4. The screw propeller (models).

*Transportation—land.* Land transportation is shown in six series (models): 1. The burden bearer, man and beast. 2. The sliding load. 3. The rolling load. 4. The wheeled vehicle. 5. The steam locomotive; and 6. The railway track.

The great group of elaborative activities concerned in manufacture is illustrated by four exhibits: the ceramic art, the textile art, metal work and sculpture.

*Ceramic art.* In this exhibit are included four series: 1. Implements and devices employed in manufacture—modeling tools, decorating tools, stamps, molds and the throwing wheel. 2. The vase, showing progressive steps in shaping and decorating and in the results of firing on paste and surface finish. 3. Glass making in its relation to ceramics; and 4. Enamel.

*Textile art.* Weaving is represented by three series: 1. The spindle. 2. The shuttle; and 3. The loom, the latter illustrating in a remarkable manner the rapid transition from primitive to highly developed appliances.

*Metal work.* The history of this important branch is partially presented in three series. 1. Metal reduction. 2. Products of manufacture showing progressive order in processes, forms and embellishments; and 3. Tools and appliances of manufacture.

*Sculpture.* The stone-shaping arts begin with the simplest known artificial modifications of natural forms, and advance to the achievement of the highest ideals, as represented in Greek art. Four series are shown:

1. Prehistoric stone shaping (Europe). 2. Aboriginal American sculpture. 3. Sculpture of civilized nations; and 4. Implements used in stone shaping. Series 1, 2 and 3 are separated for the purpose of contrasting the work of distinct periods and peoples.

*Photography.* This art, the product of advanced culture, is represented by three series of objects, epitomizing the development of: 1. The camera. 2. The lens; and 3. The picture.

*The book.* A limited series of objects is devoted to the history of the book; the method of assembling the several parts—the tablets and sheets—being the feature considered.

*Electricity.* Electrical inventions, representing one of the youngest and most marvelous branches of human activity, are shown in three limited series: 1. Experimental apparatus (Henry). 2. Transmitting apparatus (Morse and subsequent inventors); and 3. Recording apparatus.

*Music.* Four series are devoted to the history of as many varieties of musical instruments: 1. Wind instruments. 2. Reed instruments. 3. Stringed instruments; and 4. Percussion instruments.

The system of arranging these series is such as to make them fully intelligible to the average museum or exposition visitor. A large label or sign is framed and placed outside each case at the top; a general label for each exhibit, giving briefly the history of the subject treated, is framed and placed inside the case. Also a label explaining each progressive series is placed at the beginning of the series, and individual labels describing the specimens are placed with the specimens.

Associated with these developmental series are a number of life-size figures, modeled in plaster and appropriately costumed, intended to illustrate the practice of the arts in their primitive stages. They

give a vivid impression of primitive processes and serve to contrast these with the methods and machinery of advanced civilization. The subjects presented are as follows :

*The fire maker.* A Ute Indian making fire by twirling between the palms of his hands a wooden shaft, with its point set into a conical depression in a second piece of wood.

*The drill.* An Eskimo man, in reindeer skin costume, using a bow drill for perforating an ivory ornament.

*The flint flaker.* A Powhatan Indian roughing out stone implements from quartzite boulders.

*The hominy huller.* A Southern Indian woman pounding corn in a wooden mortar. Figure in plaster with costume restored from drawings made by members of the Virginia colonies.

*The skin dresser.* A Sioux woman using a scraping or graining tool in preparing a buffalo robe.

*The potter.* A Papago Indian woman modeling an earthen vessel.

*The metal worker.* A Navajo Indian making silver ornaments. Processes probably, in part at least, introduced by whites.

*The belt weaver.* A Zuni girl with primitive loom weaving a belt.

These exhibits form a part of the series now in course of preparation for the National Museum, and are mere outlines of the subjects as they will finally be presented. It is conceived that a measurably full series of such exhibits will be of high educational value, giving a comprehensive notion of a large number of the greater facts of anthropology. By no other scheme of display of objective material can the whole career of the race, especially of its intellectual development—its greatest characteristic—be so clearly set forth. The objects are not assembled chronologically, but pertain to all times and to all peoples. The

place of each specimen in the series is determined by its estimated relation to the successive levels of culture ; and the exhibits when completed may be taken to illustrate the full range of human accomplishment as it stands to-day or as comprehending the entire human period. These exhibits thus present the whole scope of human achievement, so far as human handiwork can express it, and serve at the same time to indicate with approximate accuracy the main steps of progress made by the race in its tedious ascent from lowest savagery to highest civilization.

W. H. HOLMES.

#### CURRENT NOTES ON PHYSIOGRAPHY.

##### THE LAKES OF FRANCE.

ANDRÉ DELEBECQUE, of Thonon, Haute Savoie, France, has for some years past devoted himself to the study of the lakes of his country, on which he has already written fifty odd papers. He now produces a handsome monograph, 'Les Lacs Français' (Paris, Chamerot et Renouard, 1898), the most elaborate work of its kind yet published. All the lakes of France, over 400 in number, are described ; the larger ones being studied as to location, depth, form, deposits, temperature, color and composition of water, origin of basins, and changes due to natural processes. The volume contains 22 maps and 153 figures. Under lake sediments it is well to note that, except close to the shore lines, lake bottoms are covered with an impalpable alluvium, quite like the sandstones that are often described under the head of lacustrine deposits in the Rocky Mountain region. The sub-lacustrine ravines, by which inflowing streams of low temperature and bearing glacial silts descend to the bottom of the larger lakes down the slope of their deltas, are interesting features ; they raise the question whether some other condition than 'continental elevation' may be found to